

ing and succeeding response, the great law of proenvironment is constantly at work." Again, we have the same fallacious hysteron proteron. Surely the emancipation of the hand was the outcome of variations of structure and habit which are left unexplained (not that we can explain them); surely the cerebral initiative that put the free hand to manifold tests and found for it a thousand uses was and is a cause, not a consequence; moreover, the hereditary entailment of individual gains is a hypothesis, not a proven fact. We wish to make clear that when Prof. Macfarlane speaks of "the capacity of an organism for perceiving and then positively growing or moving toward an environment that is most satisfying for it," he is not defining any new "law of proenvironment," but referring to the fundamental fact that the organism is a self-preservative agent. In so far as other evolutionists have forgotten this and made the organism a passive pawn in a game, or a portmanteau of potentialities which require only liberating stimuli, Prof. Macfarlane's thesis is of great service. He has hold of the open secret that the organism shares in its own evolution.

(7) Our admiration is commanded by the two chapters in which the author gives an appreciation of the two great ways—competitive and co-operative—in which organisms answer back to the difficulties and limitations that beset them, though we do not think he realises what Darwin clearly expressed, that a co-operative reaction to a crisis is as much part of the struggle for existence as a competitive one. We wish that we had space to refer to the concluding chapters on human evolution, which are marked by a splendid earnestness and a truly evolutionistic hope. We can only refer to the cope-stone of Prof. Macfarlane's hierarchy of substance. Just as biotic energy is associated with protoplasm, coginitic energy with chromatin, cogitic energy with neuratin, so there is "spiritic energy"—a still more condensed mode—which "has so functioned as to energise the more aspiring and lofty souls of humanity to widest outreachings, toward the most profound questions of the world and the universe." "The phenomena, the experiences of human life in the past millennia especially, powerfully suggest to the writer that built up on, energised by, linked into complex relations by, a combined biocognito-cogitic union is a still more complex substance than the protoplasmatin, chromatin, or neuratin, probably resident in some part of the gray frontal matter of the brain, and which hypothetically we may call the *spiritin*." No man understands his brother's philosophy, and we do not know what Prof. Macfarlane is getting at by his quaint and uninviting system of substances and energies. There may be some, however, to whom it makes the riddle of the organism—body-mind and mind-body—clearer; and we are sure of this, that there are facts enough in the volume to reward even the learned, and that the whole work is marked by resoluteness and sincerity.

J. A. T.

AMERICAN UNIVERSITIES.

- (1) *The America of To-day. Being Lectures delivered at the Local Lectures Summer Meeting of the University of Cambridge, 1918.* Edited by Dr. Gaillard Lapsley. Pp. xxv + 254. (Cambridge: At the University Press, 1919.) Price 12s. net.
- (2) *The Voyage of a Vice-Chancellor.* Pp. ix + 139. (Cambridge: At the University Press, 1919.) Price 6s. net.

(1) **T**HIS volume of lectures delivered at Cambridge in the summer of 1918 contains only two chapters of direct technical interest to the readers of NATURE—namely, that of Prof. J. W. Cunliffe, on "American Universities: their Beginnings and Development," and that by Dr. G. E. MacLean on "State Universities, School Systems, and Colleges in the United States of America." The first of these gives a very interesting account of the English origins of American universities, of the effect of the different environments in bringing about a gradual departure from the English model, the injection of German influence, and the subsequent growth along more independent lines. The similar process of development is traced by Dr. MacLean with respect to the State-supported institutions, which have no direct counterpart in Great Britain. A very clear account is given of the various ways in which State and federal subsidy is provided for these institutions, and there is a brief discussion of the type of administrative organisation which has grown up. Both Prof. Cunliffe and Dr. MacLean rightly emphasise the ideals of universal education which have led to such a large expenditure of public money upon the school system as a whole. The result is, perhaps, that the reader unfamiliar with the situation would get too rosy a picture of the state of affairs. Not that there is any loss of faith in the ideals, but that, as Dr. MacLean points out, there is a strong feeling that great changes of method are necessary, and, indeed, such changes are constantly under discussion and under trial. Though they have no direct bearing on the subject of education, chaps. iii. and iv., by Lord Eustace Percy, on "State Municipal Government" and "Social Legislation," read in conjunction with those on education, will give a fairer idea of the tremendous problems presented by education in America and of the political and social difficulties involved in their solution.

(2) Such an important journey as that of the British University Mission in the autumn of 1918 to Canada and the United States will doubtless be the subject of formal and formidable reports both in England and America, but it is well to have also such an intimate and clever personal record of daily happenings as Dr. Shipley has given us in this volume. Though the account, in diary form, is very brief, one gains a clear impression of the differing characteristics of the various institutions and regions which were visited. As one reads of the unbroken series of banquets and

luncheons to which the commission was ruthlessly exposed, the number of speeches which they were forced to make, and the other at least equal number to which they were compelled to listen, one is impressed by the fact that this academic group "did their bit" in a very real sense. One also wonders whether the present demand for a reduction in the hours of labour could not be directed towards a change in the customs of after-dinner speaking, resulting in a great conservation of the nervous energy of the world. It is to be hoped that the journey which is here so gracefully described is but the first of many, perhaps less formal but more leisurely, which will be undertaken by academic and scientific men of both countries. It would be a pity if the greater intimacy and understanding, which war conditions have undoubtedly brought about between the men of science of England and America, should for any cause be allowed to lapse. C. E. M.

OUR BOOKSHELF.

The Statesman's Year-book. Statistical and Historical Annual of the States of the World for the Year 1919. Edited by Sir John Scott Keltie and Dr. M. Epstein. Fifty-sixth Annual Publication. Revised after Official Returns. Pp. lii + 1476. (London: Macmillan and Co., Ltd., 1919.) Price 18s. net.

ONE turns to the new volume of this ever-welcome annual with considerable interest in view of the present fluid condition of international affairs. The coloured map shows the condition of Europe in June of this year, the accession to political sovereignty of Iceland, Poland, and Czechoslovakia is recognised by their treatment in new and separate sections, and the introductory pages contain the League of Nations Covenant, a summary of the peace terms to Germany, and a continuation of the diary of the war. The Iceland section summarises the consequences of the Act of Union of November, 1918, which makes the connection between Denmark and Iceland, in other than certain temporary arrangements, entirely due to the fact that both States have the same King. Although it has not been possible to include statistics regarding the dismembered Austro-Hungarian Empire, various estimates have been included—e.g. the new Austrian Republic has a population of some ten millions, of whom 90 per cent. are Germans; the probable population of Yugo-Slavia is twelve to thirteen millions. There are brief summaries of the results already achieved by British administrators in Mesopotamia, and of the newly independent kingdom of Hejas.

The Boys' Own Book of Great Inventions. By Floyd L. Darrow. Pp. ix + 385. (New York: The Macmillan Company; London: Macmillan and Co., Ltd., 1918.) Price 12s. 6d. net.

THIS book contains a popular and interesting account of the more important inventions of the last hundred years. One chapter is devoted to the

gyroscope; six to telegraphy and telephony, with and without wires; two to aviation; and one each to the submarine; the steam engine; petrol, oil, and gas engines; the use of machinery in agriculture; the development of electricity; the evolution of artificial illumination; fire and high temperatures; some notable achievements in chemistry; the story of iron and steel; and Galileo and the telescope. The treatment is unusual. The author in most cases first appeals to general interest by describing practical achievement. He then gives an account of the theory, and concludes with a few experiments which the boy may perform for himself.

The style is good, the information is accurate, and the explanations are generally clear. The experiments are to the point, but, appearing as they do detached from the descriptions of the apparatus and process, they appear to be scrappy and unsatisfactory. Many of them are quite unnecessary in the case of a boy who is doing science at school, and to a boy who is not they would not all prove helpful. We prefer description and explanation, even where that involves experiment, to be more closely associated.

The value of some of the half-tone blocks is much reduced by printing two or three on a page, which renders them indistinct.

Apart from these minor defects, the book is first-rate, and will form an excellent gift for a boy who is interested in scientific achievement.

E. C.

Interpolation Tables or Multiplication Tables of Decimal Fractions. Giving the Products to the Nearest Unit of All Numbers from 1 to 100 by 0.01 to 0.99 and from 1 to 1000 by 0.001 to 0.999. By Dr. Henry B. Hedrick. Pp. ix + 139. (Washington: Carnegie Institution of Washington, 1918.)

THE simplest description of these tables is to say that they give such results as $0.302 \times 441 = 133$ with the certainty (barring errors in the tables) that the third digit in the product is correct. Taking out such a product from the tables is an easy operation, requiring very little time; probably, with practice, the use of the book would be as expeditious as that of an ordinary slide-rule, and the results more trustworthy.

Various other ways of using the tables are explained in the introduction. The editor also gives interpolation formulæ, and worked applications to astronomy, etc., in which these tables are used.

This publication appeals to a large body of computers and scientific workers, and affords another instance of the wise enterprise of the directors of the Carnegie Institution. They have already earned the gratitude of arithmeticians by their tables of primes and factors, and they are doing a public service by thus undertaking the cost of printing works at which no ordinary publisher would look for a moment.

The printing and arrangement of the tables seem to be all that could be desired.

G. B. M.